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C O N F I D E N T I A L SECTION 01 OF 04 TAIPEI 000343

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SUBJECT: SEMICONDUCTORS - TAIWAN FIRMS FACING CHINA,S
CHALLENGE

REF: A. TAIPEI 268

[1](#)B. TAIPEI 278

[1](#)C. 04 TAIPEI 3930

Classified By: AIT Director Douglas H. Paal, Reason 1.5 b/d

Summary

[1](#)1. (C) With a market downturn expected to continue in 2005, Taiwan semiconductor manufacturers will be increasingly concerned about competing in the PRC chip market with local firms. Relatively new PRC firms like Semiconductor Manufacturing International Corporations (SMIC) and Grace Semiconductor Manufacturing Corporation (GSMC) have been very successful over the last year at increasing production capacity and implementing more advanced manufacturing technology. Taiwan Semiconductor Manufacturing Corporation (TSMC) has blamed, at least in part, illegal business practices for SMIC's success and has filed suit in the U.S. However, Taiwan firms still have the advantage. They are making important investments to maintain that advantage, and it appears that Taiwan's manufacturing base will maintain dominance for the next five years. Meanwhile, some Taiwan firms want their government to further liberalize semiconductor investment in the PRC, an issue that will have strategic implications for the U.S. The Taiwan government should further relax investment restrictions in a manner that maintains consistency with U.S. export control regulations and avoids damaging Taiwan's semiconductor manufacturing base. (End summary.)

Stiffer Competition in 2005

[1](#)2. (U) The semiconductor industry is the centerpiece of Taiwan's economy. It has important symbolic value as the driving force in Taiwan's emergence as a major center for high-tech industries, and even after more than two decades, it continues to be a critical component in Taiwan's economy. With total projected output of NT\$ 1,114 billion (USD 35 billion) in 2004, the integrated circuit (IC) industry alone (excluding those suppliers and buyers who rely on the IC industry) accounts for almost 3 percent of Taiwan's total GDP. Chip manufacturing still dominates Taiwan's industry, accounting for 58 percent of total IC revenue. Semiconductor foundries, or manufacturers that produce made-to-order ICs on contract, make up the largest portion of IC manufacturing with 66.4 percent of revenue. Taiwan has the world's two largest foundry firms) Taiwan Semiconductor Manufacturing Corporation (TSMC) and United Microelectronics Corporation (UMC). Nevertheless, other segments of the IC industry are also important. IC design firms earned NT\$ 260 billion (USD 8.1 billion) in 2004, and packaging and testing firms took in NT\$ 159.5 billion (about USD 5 billion).

[1](#)3. (U) The year 2004 was good for the semiconductor industry in Taiwan and around the world. Taiwan firms were producing at overcapacity for much of the first half. TSMC's sales for 2004 rose 30.3 percent from 2003. UMC's sales increased by 38.2 percent. However, prospects for the industry worsened toward the end of 2004. By the fourth quarter, TSMC's capacity utilization had declined to 84-86 percent, with analysts predicting a further decline to 70-80 percent in the first half of 2005. TSMC's CEO and Chairman Morris Chang told AIT/T he expects a return to growth in the third or fourth quarter of 2005. For the IC industry as a whole, some observers predict zero growth or even contraction for 2005.

PRC Success

[1](#)4. (U) An industry-wide slowdown will sharpen Taiwan firms' focus on the Mainland chip market and competition from relatively new, but highly successful Chinese firms like Semiconductors Manufacturing International Corporation (SMIC) and Grace Semiconductor Manufacturing Corporation (GSMC). A recent report by market research firm iSuppli estimated that China's chip-making foundry capacity grew by 78.2 percent in [1](#)2004. Taiwan firms are not only concerned by the growth of PRC firms in scale, but also by advances in technology. SMIC

already has capability to produce memory chip with 90-nanometer feature size. According to reports in the online trade journal Silicon Strategies, SMIC is also working with Texas Instruments to develop 90-nanometer manufacturing processes for logic chips as well. Their pricing is highly competitive too. Citigroup analysts recently reported that SMIC is undercutting TSMC's price for 0.13-micron logic chips by 30 to 40 percent. Not to be overlooked, media reports indicate that GSMC is in negotiations with a U.S. firm to develop .13-micron tech and will break ground on a 12-inch wafer manufacturing plant in 2005.

Accusations and Recriminations -----

15. (U) Accusations have been exchanged in Taiwan about who is to blame for the success of PRC firms. Stan Shih, the recently retired Chairman of Taiwan PC manufacturer Acer Inc., blames Taiwan's investment restrictions for the success of PRC semiconductor firms. He believes that Taiwan firms could have eliminated PRC competition early had they been allowed to compete on their turf (ref C).

16. (U) TSMC blames illegal business practices for at least part of SMIC's sudden success. In suits pending before California State Courts and the U.S. International Trade Commission, TSMC accuses its PRC rival of various forms of industrial espionage and intellectual property rights infringements. It claims SMIC violated TSMC patents and hired 100 TSMC employees by offering higher salaries. The employees included many key engineers accused of provided TSMC trade secrets. The dispute may have taken on a more

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personal tone with the annual Taiwan and China Semiconductor Outlook Conference in San Jose December 7. Media reports speculated that TSMC boycotted the event because SMIC CEO Richard Chang was a keynote speaker. TSMC had sponsored the event in the past. However, according to the reports, not only did TSMC decline to sponsor the 2004 event, its executives did not even attend.

Staying Competitive -----

17. (U) Taiwan firms still have a clear advantage over their PRC competitors. In 2003, Taiwan firms controlled 71 percent of the foundry market. Furthermore, more advanced technology accounts for a larger portion of Taiwan firms' revenue. According to a study by Taiwan's Industrial Technology Research Institute (ITRI), more than 20 percent of TSMC's sales are 0.13-micron semiconductors. For SMIC this more advanced technology accounts for less than 10 percent of sales. Some observers also point out that SMIC's production is not as efficient as its Taiwan competitors with lower yield rates that TSMC and UMC.

18. (U) TSMC's Chang told AIT/T that TSMC would not sit back and let the competition get ahead of them or even catch up. Taiwan firms are taking important steps to stay competitive in the medium and long term. TSMC, UMC and other Taiwan firms continue high levels of investment; expanding levels of production of the most advanced products, such as 90-nanometer chips, while developing new technologies, including 45-nanometer products and immersion lithography processes. Although Chinese firms are also making huge investments to expand capacity and improve technology, they're not keeping pace with Taiwan firms. According to media reports, SMIC's planned investment for 2005 is less than half of TSMC's.

19. (U) The outlook for Taiwan's position in the industry over the next few years is good. TSMC's Chang told us, he predicts Taiwan will maintain its advantage over the PRC for at least five years. According to Taiwan's Ministry of Economic Affairs (MOEA), Taiwan firms have six 12-inch wafer semiconductor fabs under construction on the island and plans for two more on top of four plants that are already operational. MOEA predicts that by 2006 Taiwan will have at least 10 such plants compared to seven in the U.S., five in Japan and two in South Korea. On the other side of the Strait, SMIC currently has one 12-inch fab in operation and one on the drawing board. GSMC also has one in the planning stages. iSuppli predicts that by 2007 the PRC will have no more than three functioning 12-inch fabs. Taiwan also appears poised to maintain its advantage in IC design. The ITRI study, predicts that Taiwan's IC design revenue will be five times Mainland China's until 2006.

Taiwan Investment in Mainland -----

10. (C) Nevertheless, the PRC chip market is essential to the future of Taiwan firms. Many analysts predict that the PRC will be world's largest market for semiconductors by 2008. Some Taiwan firms will be able to supply Mainland demand with

manufacturing based in Taiwan. James Fang, Assistant Vice President of Winbond Electronics told AIT/T that there was no need for Winbond to invest in manufacturing in the PRC, even though up to 60 percent of its output is sold to firms in the Mainland. He pointed out that his firm is a product firm not a foundry, selling its own standardized semiconductor products instead of manufacturing made-to-order chips on contract for other firms. Because of this, it does not need to base manufacturing close to the buyer.

11. (U) Other firms believe they need to have fabs in the Mainland to compete. Foundries in particular point to the need to consult closely with clients. TSMC was the first Taiwan firm to build a plant in the Mainland with an 8-inch fab near Shanghai, which started production in the fourth quarter of 2004. In the last week of 2004, two more Taiwan firms, ProMOS and Powerchip, submitted applications to Taiwan's MOEA to build their own fabs in the PRC. Because Taiwan has only agreed to approve a total of three such projects, the two new applications will fill this quota if approved and cut off new semiconductor investments until further liberalization (ref A). In addition, many industry observers believe that UMC has circumvented Taiwan government restrictions in its close relationship with Mainland foundry He Jian.

12. (C) TSMC, especially Chairman Chang, has been very vocal in urging the Taiwan government to liberalize semiconductor investment restrictions to allow Taiwan firms to use 0.18-micron technology in PRC manufacturing facilities. Previously, TSMC had indicated that it could meet Mainland demand with 0.25-micron products. TSMC's CEO F.C. Tseng recently told the press that 80 percent of TSMC clients are shifting to 0.18 or 0.13 technology. Justin Wang, Director of TSMC's Market Analysis and Forecast Division, told us that TSMC would also be interested in 0.13-micron manufacturing in

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the PRC if allowed. Without further liberalization, Wang says that TSMC will have to consider other options like investing in existing semiconductor manufacturing enterprises in the Mainland.

13. (C) MOEA's Investment Commission asked AIT/T what the U.S. government's reaction would be to Taiwan lowering its restrictions to allow investment in 0.18-micron manufacturing technology (ref B). Taiwan's government has also been considering for some time the legalization of investment in the PRC in semiconductor packaging and testing industries. Mainland Affairs Council Economics Department Director Fu Don-cheng told AIT/T earlier this month that Taiwan may approve these categories within the next two months.

Comment - Implications for the U.S.

14. (C) A few years ago, many observers predicted that the semiconductor industry would stay in Taiwan and resist the trend in other industries to move manufacturing operations across the Strait. They noted the importance of the semiconductor "cluster" in Taiwan, pointing to the collocation of design, manufacturing, packaging and testing firms centered in the Hsinchu Science Park. The cluster provided a solid source of highly skilled personnel and facilitated collaboration and the exchange of new ideas. Clearly, a new cluster is forming in the PRC. The emergence of this cluster in the PRC suggests at least two important questions for the U.S.

15. (C) First, how will the development of domestic semiconductor manufacturing affect the PRC's military capacity? The U.S. will have to manage this issue together with other governments through careful implementation of technology transfer restrictions, especially export control restrictions. We should encourage Taiwan to maintain vigilance in using its investment policies toward this end. The second question concerns the viability of the semiconductor industry in Taiwan. What are the implications for U.S. security if the Taiwan cluster disappears? According to the U.S. Taiwan Business Council, Taiwan accounts for nearly 90 percent of the world's graphic chips and over 20 percent of all memory chips. If Taiwan firms cannot stay competitive, the U.S. could actually begin to rely on the PRC's semiconductor manufacturing infrastructure.

16. (C) Taiwan's technology transfer regime appears to be more restrictive in some ways than our own. Restrictions on PRC investment are holding back some Taiwan firms as they endeavor to compete for the Mainland chip market. Modest relaxation at this time will help keep Taiwan firms in the game and reduce the momentum of PRC competitors, possibly even benefiting the Taiwan manufacturing base. Nevertheless, liberalization measures will have to be carefully calibrated to limit technology transfer and maximize benefits to the Hsinchu semiconductor cluster. Taiwan should also take other

steps to liberalize cross-Strait economic relations that would facilitate Taiwan semiconductor firms' ability to engage the PRC market. These include direct transportation links and liberalization of personnel and financial flows. (End comment.)
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